AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. – 6. (cancelled).

7. (amended) An automatic introduction apparatus for automatically introducing a target celestial object by controlling a rotation of an astronomical telescope around at least two axes, said apparatus comprising:

an image-capturing means, which is adapted to capture an image of a celestial object at a plurality of focal distances;

a celestial object database; and

a celestial object identification means for identifying celestial objects ~~each of~~ which images have ~~has~~ been captured by said image-capturing means, by comparing said images of celestial objects captured by said image-capturing means with a set of celestial object information in said celestial object database, wherein

said automatic introduction apparatus is configured to perform an alignment process for defining a set of coordinate transformation information of a coordinate system in said astronomical telescope relative to a celestial coordinate system comprises an automatic routine including:

(a) capturing an image of celestial objects by said image-capturing means which is set at a predetermined focal distance;

(b) identifying a celestial object in said celestial object image;

(c) correcting said coordinate transformation information based on the position information of said identified celestial object; and

(d) determining if said identified celestial object is introduced into a center of field in the captured image with a sufficient precision;

(e) controlling a rotation of said astronomical telescope so that said celestial object is introduced into a center of field in the captured image if said identified celestial object is not introduced with the sufficient precision, and ending said automatic routine if said identified celestial object is introduced with the sufficient precision;

(f) shifting the focal distance of said image-capturing means to a longer focal distance for a more telescopic side; and

(g) capturing an image of said celestial object by said image-capturing means which is set at said longer focal distance,

wherein the steps (b) to (g) of said automated routine are ~~is~~ repeated, until said automated routine is ended in the step (e) ~~using a focal distance of said image-capturing means that is shifted to a focal distance for a more telescopic side, until the celestial object is introduced into a center of field in the captured image with a sufficient precision~~.

8. (previously presented). An automatic introduction apparatus in accordance with claim 7,

wherein an area of the current sky in which a field of view is not blocked is selected as a candidate area in which to capture the image by said image-capturing means in said step (a), before said routine is performed.

9. (previously presented). An automatic introduction apparatus in accordance with claim 8, in which said alignment process is executed by repeating said routine for each of at least two celestial objects.

10. (currently amended) An automatic introduction apparatus configured to perform a process for automatically introducing a target celestial object by controlling a rotation of an astronomical telescope around at least two axes, said apparatus comprising:

an image-capturing means, which is adapted to capture an image of a celestial object at a plurality of focal distances;

a celestial object database; and

a celestial object identification means for identifying celestial objects ~~each of~~ which images have ~~has~~ been captured by said image-capturing means, by comparing said images of celestial objects captured by said image-capturing means with a set of celestial object information in said celestial object database,

said automatically introducing process comprises an automated routine including:

(a) capturing an image of celestial objects by said image-capturing means which is set at a predetermined focal distance;

(b) identifying a celestial object in said celestial object image; [[and]]

(c) controlling said astronomical telescope to rotate so that said target celestial object is introduced into a center of field of said telescope ~~in the captured image~~ based on the set of position information for said identified celestial object,

(d) determining if said target celestial object is introduced into the center of field of the telescope with a sufficient precision;

(e) shifting the focal distance of said image-capturing means to a longer focal distance for a more telescopic side if said target celestial object is not introduced with the sufficient precision, and ending said automatic routine if said target celestial object is introduced with the sufficient precision; and

(f) capturing an image of said celestial object by said image-capturing means which is set at said longer focal distance,

wherein the steps (b) to (f) of said automated routine are ~~is~~ repeated, until said automated routine is ended in the step (e) ~~using a focal distance of said image-capturing means that is shifted to a focal distance for a more telescopic side, until said target celestial object is introduced into the center of a field in the captured image with a sufficient precision~~.

11. (cancelled)

12. (original) An automatic introduction apparatus in accordance with claim 10, in which said celestial object identification means has a function to extract an area including a celestial object that has not been image-captured based on said celestial object images captured by said image-capturing means and to determine whether said target celestial object exists in said area.

13. – 40. (cancelled)

41. (previously presented) An automatic introduction apparatus in accordance with claim 7, in which said celestial object database is renewed based on a set of celestial object information obtained via an electric communication means.

42. (previously presented) An automatic introduction apparatus in accordance with claim 7, in which

an initial parameter for said alignment process is established automatically based on a set of position information of celestial objects identified by said celestial object identification means.

43. (cancelled)

44. (previously presented) An automatic introduction apparatus in accordance with claim 10, in which said celestial object database is renewed based on a set of celestial object information obtained via an electric communication means.